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ABSTRACT

The Preschool Learning Development Program (PLD) in Long Valley, New Jersey, was designed to identify preschoolers with developmental handicaps and provide them with systematic, individualized, instructional intervention to enhance developmental rate prior to entry into public school. The PLD Program consisted of three components: candidate search, diagnostic screening and evaluation, and the individual educational prescription (IEP). A study was conducted to determine whether PLD Program participants exhibit higher developmental growth rates as measured by the PLD Inventory. It was found that slow developing and handicapped preschool children who are given a focused, systematic program designed on the PLD model show significantly greater growth rates than those expected of normally developing preschoolers not exposed to such programming. (SW)

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THE PRESCHOOL LEARNING DEVELOPMENT PROGRAM

VALIDATION STUDY

by

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April, 1984

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The PLD Validation Study

The Preschool Learning Development Program (PLD) is a diagnostic-prescriptive management system for preschool developmentally handicapped children. The PLD Project was designed and implemented in the Washington Township School District, Long Valley, New Jersey. The major purpose of the PLD Project was to identify preschool children whose developmental progress in any of 8 categories of growth was so delayed as to qualify as handicapping, and to provide systematic, individualized, instructional intervention for the purpose of enhancing that developmental rate prior to the child's entry into public schooling at age five.

There are three components essential to the PLD Program: the candidate search, the diagnostic screening and evaluation, and the individual educational prescription.

Candidate search - project staff conduct a comprehensive information and request-for-referral process at the start of each year. Announcements describing the program and the services provided to handicapped preschoolers are published in all local news media, and sent to a number of community groups which have expressed their interest in similar causes. Letters are sent each year to area pediatricians, doctors, hospitals, clinics, child study centers, ARC chapter, nursery schools, day care centers, public schools, and social service agencies advising them of the availability of services for preschool handicapped children through the PLD Program, and inviting referrals for screening.

Diagnostic screening and evaluation - the special screening instrument which serves as the basis for the PLD Project approach is the PLD Inventory. This criterion-referenced screening instrument was uniquely designed to relate in a functional manner to the PLD Curriculum, and is structured on sequential skills mastery. The 8 categories of child development which are tested in the Inventory are:

Gross Motor	Expressive Language
Fine Motor	Cognitive
Visual Perception	Social-Emotional
Auditory Perception	Fund of Information

Screening outcomes are quantified and graphed in the form of an Individual Developmental Profile, which serves as the baseline from which the child's progress can be recorded. Program participants are selected as a result of diagnosed developmental discrepancy of one year or more in any of the 8 categories.

Individual Educational Prescription - (IEP) - An educational plan, based upon the observed levels of development on the PLD Profile is prepared for each child in the program. The teacher uses the management system structure of the PLD Curriculum, which identifies performance tasks appropriate to each level in each category, to determine the child's program objectives. Objectives proceed on a continuing, sequential basis, enabling measurement of progress and prescription modification to be continuous and on-going.

In 1980, the PLD Program was awarded a federal grant to pursue national validation. To prove the validity of the approach, a rigorous research study was conducted and reviewed by an impartial panel. The results of the evaluation study led to the awarding of national validation in 1981 to the PLD Program. The following report describes the validation research study and outcomes.

The Study

Objective - PLD Program participants will exhibit higher developmental growth rates ($p \leq .05$) as measured by the PLD Inventory than the standard rates based on a preschool population of nonparticipants (80% of which were normal nursery school children, and 20% of which were low-functioning non-nursery school children).

Research Design - The evaluation design was the norm-referenced model. Experimental students were handicapped children between the ages of 2 and 5 who participated in the PLD Program during the four years of its operation. The nature of the children's handicaps varied, but included mental retardation, perceptual and neurological impairment, orthopedic, and language handicap. Comparison children were selected from a population of children who were screened with the PLD Inventory, but did not become project participants.

Amount of Change Expected - It was anticipated that at least 50% of the experimental students in the PLD Program would exceed the standard growth rates of normal preschool children (control group) not in the program over the same period of time. One might normally expect handicapped and developmentally delayed children to achieve at a slower rate on developmental measures compared to their non-handicapped age peers. The 50% minimum standard of handicapped children who would not only match the developmental rate of non-handicapped as a result of programming, but would actually exceed that rate, was a very rigorous standard for the population in question. The fact that 80% of the control group experienced nursery school further adds to the rigor of the derived standard.

It was anticipated that the difference between the actual mean post-test scores of the project group on the PLD Inventory (for each sub-test and for the total test) and the predicted mean post-test scores, based on a standard of normal growth rate, would be statistically significant ($p \leq .001$) in favor of the actual PLD group mean.

Evaluation Instrument - The PLD Inventory was designed by Dr. Frances Hobbie and Project staff. The Inventory is a criterion-referenced test of early childhood development constructed on the Rasch Model, and tailor-made to interface with the PLD management system. The Inventory includes 8 independently usable subtests, plus a total developmental score. The number of tasks in the Inventory range from 15 to 25 per subscale, with a total of 154 tasks. The PLD Inventory is sensitive to the program objective by virtue of its design and the strength of its statistical properties.

a. Validity - The statistical properties of the PLD Inventory are within acceptable limits for its intended use, as presented in Table I: Psychometric Properties of PLD Inventory. The coefficient of stability for the 8 categories of the test (col. 3) range from .35 to .90, with a mean of .59, and the total test being .86. The standard error of measurement (col. 2) is from .95 to 1.57 for the subscales, with the total being 4.35.

b. Predictive Validity coefficients (col. 4), using the number of objectives in the PLD Program achieved as the criterion, range from .66 to .91; with the KLD Inventory (an upward extension of the PLD Scale, used in the kindergarten), they range from .35 to .76.

c. Construct Validity - coefficients of the PLD Inventory (Col. 5), using a criterion of age differentiation, range from .49 to .64 for the subscales, and .57 for the total.

d. Concurrent Validity coefficients with two I. Q. tests - the McCarthy and the WPPSI - (Col. 7) range from -.27 to .49, with the mean being + .19. These low and sometimes negative coefficients with I. Q. are to be expected since the PLD and the intelligence tests are not measuring the same attributes.

e. Content Validity - is measured through comparing the mean difference of pre - to post - instructional scores on the PLD Inventory (Col. 8) which range from + 2.37 to + 5.16 for the subscales, and + 25.25 for the total PLD, all of which are statistically significant at the .001 level, the analysis being made using a matched group t-test.

f. Reliability - examiner estimated reliability of the PLD Inventory was measured by having two separate examiners test the same children within a short time interval (1 week) with the Inventory. Reliability coefficients (Col. 6) range from .35 to .80 for the subscales, with a mean of .59. Estimated reliability of the total scale is .86.

TABLE 1

Psychometric Properties of PLD Inventory

	Number of Tasks	Standard Error of Measurement	Coefficient of Stability[1]	Coefficient of Predictive Validity[2] A	Coefficient of Predictive Validity[2] B	Coefficient of Construct Validity[3]	Examiner Reliability[4]	Coefficient of Concurrent Validity[5] A	Coefficient of Concurrent Validity[5] B	Pre-to-Post Program Mean Difference
Gross Motor	25	1.31	.58	.67	.69	.58	.58	.26	.42	+2.42[6]
Fine Motor	25	1.26	.80	.79	.42	.57	.80	.47	-.06	+4.11
Visual Perception	15	.95	.42	.76	.68	.57	.42	.49	-.10	+3.67
Auditory Perception	15	1.26	.35	-[7]	.35	.45	.35	.42	-.05	+2.37
Expressive Language	15	1.57	.60	-[7]	.62	.53	.60	.24	.09	+2.94
Cognitive	15	1.16	.75	.66	.67	.61	.75	.16	.27	+3.24
Fund of Information	20	1.42	.77	.78	.76	.49	.77	.37	-.27	+5.16
Self Awareness	24	1.21	.44	.91	-	.64	.44	.03	.09	+3.32
PLD Inventory Total	154	4.35	.86	-	-	.57	.86	.37	.26	+25.25
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7		Col. 8

All coefficients are computed using the Pearson product -moment (zero-order) technique and are positive unless otherwise noted.

1. Retest with same form on different occasion.
2. Criterion is number of PLD program objectives achieved for A; the KLD for B.
3. Criterion is age differentation.
4. Retest with different test administrators.
5. A = McCarthy I. Q.; B = WPPSI I. Q.
6. All mean differences are statistically significant favoring post program means at .001 level.
7. No data available.

Process - The first analysis to determine if the objective was achieved used the results of a simple regression analysis to establish predicted levels of post-program achievement on the PLD Inventory (each program area and all areas totalled). The dependent variable was PLD scores of the control group; the independent variable was these children's choronological ages at time of testing. The A and B values (intercept and slope and regression of age on PLD scores) were found and then used to calculate predicted PLD values (y') for each month of chronological age on the PLD ($y' = A + B_x$). These predicted scores represent the expected values without the intervention of program. Using the regression formula to relate per month expected growth to the child's age, increased by the number of months in the program, each project child's predicted post-program PLD score was determined. This was compared to his actual post-program score. A correlated t-test analysis examined the difference in the means of actual and predicted post-program scores.

Results - It was found that from 63% to 94% of project children in the 8 program areas, and 96% of project children overall, exceeded the predicted levels of attainment. The actual post-program PLD means were significantly higher than the predicted PLD means ($p \leq .0005$) in all 8 areas separately and in total.

Significance of Results - The percent of project children whose actual post-program scores exceeded their predicted scores, ranging from 63% in the Gross Motor area to 96% for the total of all areas, is highly significant especially in view of the fact that the standard used for growth prediction was derived from the growth rates of a control group composed of 80% nursery school children who showed no developmental handicaps. The correlated t-test used to examine the difference in means of actual and predicted post-program PLD scores showed that for all program area scores separately and for totaled scores, the differences are significant at the .0005 level, in favor of PLD Program participation.

It is evident that slow-developing and handicapped preschool children who are given a focused, systematic program designed on the PLD Model show significantly greater growth rates than those expected of normally developing preschool children not exposed to such concentrated programming.